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Bulkley Timber Supply Area

Rationale for Allowable Annual Cut (AAC) Determination

Effective January 1, 2002

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Chief Forester

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Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Bulkley Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Description of the TSA

The Bulkley TSA comprises approximately 762 540 hectares in northwestern British Columbia. The TSA lies in the British Columbia Forest Service (BCFS) Prince Rupert Forest region and is administered from the Bulkley/Cassiar Forest District office in Smithers. The Bulkley TSA is bounded by the Hazelton mountains to the west, the Telkwa River watershed to the south, the Babine Mountains to the east, and extends north to the headwaters of the Nilkitkwa River. The terrain in the Bulkley TSA varies from wide river valley bottoms to high mountains.

Due to its location between interior and coastal climates, the Bulkley TSA includes diverse ecological features. It lies primarily within the Sub-Boreal Spruce and Engelmann Spruce-Subalpine Fir biogeoclimatic zones. There are smaller components of the Interior Cedar-Hemlock, Coastal Western Hemlock, Mountain Hemlock, and Alpine Tundra biogeoclimatic zones. The dominant tree species in the TSA are subalpine fir (balsam), spruce, and lodgepole pine. Hemlock and amabilis fir occur in areas of coastal influence.

Mountainous terrain and high elevations limit the amount of land considered suitable for timber production in the Bulkley TSA. For the current timber supply analysis, about two-thirds of the TSA (about 496 000 hectares) is considered productive forest land managed by the B.C. Forest Service. Approximately 68 percent of the productive forest land (about 340 000 hectares, or 45 percent of the total TSA land base) is considered available for harvesting under current management practices.

The four main communities of the Bulkley TSA are Smithers, Telkwa, Moricetown, and Fort Babine. Smithers is the largest community in the TSA, and is home to about 42% of the 13,000 residents of the TSA. The largest forestry employer in the TSA is West Fraser Mills Ltd., Pacific Inland Resources (PIR) division. PIR operates a large lumber and chipping complex in Smithers. Skeena Cellulose Inc. (SCI) has a sawmill in Smithers. Other smaller processing facilities in the TSA are: Northern Engineering Wood Products (particleboard mill in Smithers), Seaton Timber Inc. (sawmilling and value-added lumber processing in Smithers), Kyahwood Forest Products Ltd. (joint venture by Canadian Forest Products Ltd. (CanFor) and the Wet'suwet'en First Nation to produce finger-jointed lumber in Moricetown), and Alpine Cedar Products Ltd. (shake and shingle mill in Smithers).

Both residents and visitors enjoy the varied recreational opportunities available in this TSA. The mountainous terrain, lakes, and rivers of the area provide a wide range of front- and back-country recreational opportunities, including hunting, fishing, climbing and mountaineering, camping, wildlife viewing, kayaking, canoeing, rafting, horseback riding,

snowmobiling, and cross-country and downhill skiing. Several areas within the TSA offer high-quality wilderness recreation opportunities and attract visitors from the U.S. and overseas. As a result of implementation of the Bulkley LRMP, the TSA now includes seven new provincial parks: Babine River Corridor, Nilkitkwa Lake, Rainbow Alley, Netalzul Meadows, Boulder Creek, Babine Mountains and Call Lake. Burnt Cabin Bog, which the LRMP identified as requiring protection, was approved as an Ecological Reserve through a June 29, 2000 Order-in-Council.

History of the AAC

The present allowable annual cut (AAC) for the Bulkley TSA was set in 1995 at 895 000 cubic metres. The AAC includes 367 000 cubic metres for the harvest of marginal sawlog and pulplog stands. It has been apportioned by the Minister of Forests as follows.

Apportionment	Cubic metres/year	Percentage
Forest Licences – replaceable (2)	434 444	48.5
Forest Licences – non-replaceable	185 000	20.7
Small Business Forest Enterprise Program (SBFEP)	238 976	26.7
Woodlot licences	13 000	1.9
Forest Service Reserve	2 000	.7
Total	**895 000**	**100.0**

PIR has a replaceable forest licence of 311 562 cubic metres per year and a non-replaceable licence of 185 000 cubic metres per year, for a total harvest of 496 562 cubic metres per year. SCI has a replaceable forest licence of 122 882 cubic metres per year.

New AAC determination

Effective January 1, 2002 the new AAC for the Bulkley TSA will be 882 000 cubic metres.

This AAC reflects the volume issued to woodlot licences that have now been awarded and are under separate administration.

This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination.

Information sources used in the AAC determination

Information considered in determining the AAC for the Bulkley TSA include the following:

- *Bulkley TSA Timber Supply Review Data Package*, BCFS, June 1998;
- *Bulkley TSA Analysis Report*, BCFS, April 2001;

- Bulkley TSA Timber Supply Review Summary of Public Input, BCFS, 2001;
- Bulkley TSA Timber Supply Review Binder for the Allowable Annual Cut Determination Meeting, BCFS, July 2001;
- *Forest Practices Code of British Columbia Act*, consolidated to March 2001;
- *Forest Practices Code of British Columbia Act* Regulations and Amendments, current as of March 2001;
- Forest Practices Code of British Columbia Guidebooks, BCFS and MELP;
- *Bulkley Landscape Unit Plans*, 1999;
- Bulkley Land and Resource Management Plan - Higher Level Plan Order, Final, BCFS, December, 2000;
- Bulkley Land and Resource Management Plan, Final, signed off as Ministerial Policy by the Ministers of Forests, Environment, Lands, and Parks, and Energy and Mines, March, 1998;
- Identified Wildlife Management Strategy, Volume 1, February 1999;
- Letter from the Minister of Forests to the chief forester, dated July 28, 1994, stating the Crown's economic and social objectives for the province;
- Memorandum from the Minister of Forests to the chief forester, dated February 26, 1996, stating the Crown's economic and social objectives for the province regarding visual resources;
- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of the BCFS, including the AAC determination meeting held in Smithers, July 11 and 12, 2001;
- *Bulkley TSA Rationale for AAC Determination*, BCFS, July, 1995;
- *Bulkley TSA Inventory Audit*, BCFS Inventory Branch, undated.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological and social conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily

provide complete answers or solutions to forest management problems such as AAC determinations. The information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for the Bulkley TSA, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for TSAs and TFLs. Section 8 is reproduced in full as Appendix 1.

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. In making a large number of determinations for many forest management units over extended periods of time, administrative fairness requires consistency when addressing these changes and associated uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. If in some specific circumstance it is necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

(i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and

(ii) redetermining AACs frequently, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code of British Columbia Act* and its associated regulations (the Forest Practices Code).

The *Forest Practices Code of British Columbia Regulations* were originally approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although the Forest Practices Code has been underway since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

The eventual timber supply impacts associated with strategic land-use decisions resulting from the various planning processes—including the Commission on Resources and Environment (CORE) process for regional plans, the Protected Areas Strategy, and Land and Resource Management Planning (LRMP) process—are often discussed in relation to current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be my position that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions not yet taken by government. Thus I do not account for possible impacts of existing or anticipated recommendations made by such planning processes, nor do I attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impacts in a current AAC determination. In many cases, government's land-use decision must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

However, where specific protected areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base and are no longer considered to contribute to the timber supply in AAC determinations.

In the Bulkley TSA, government's approval of the Bulkley Land and Resource Management Plan (LRMP) in 1998, and subsequent decisions on protected areas have clarified many aspects of land and resource use and management.

Forest Renewal British Columbia (FRBC) funds a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long-term. As with all components of my determinations, I require sound evidence before accounting for the effects of intensive silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are improved from those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interest of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent court decisions including those in the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting those obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Bulkley TSA. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

With respect to future treaty decisions, as with other land-use decisions it would be inappropriate for me to attempt to speculate on the impacts on timber supply that will result from decisions that have not yet been taken by government. I am aware that the Wet'sewet'en and Tsimshian Nations have agreements in principle, the Lake Babine Nation has a framework agreement, and discussions with the Gitxsan Nation are moving forward. Any decisions on treaty negotiations with the First Nations that are undertaken by government will be reflected in future AAC determinations for the TSA.

Overall, in making AAC determinations, I am mindful of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act*, and of my responsibilities under the *Forest Practices Code of British Columbia Act* and the *Forest Act*.

The role of the timber supply analysis

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the timber supply review process.

For each AAC determination for a TSA, a timber supply analysis is carried out using an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model (Forest Service Simulator, or FSSIM), a series of timber supply forecasts is produced, reflecting different starting harvest levels, rates of change over time, and

potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TSA is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case forecast are realistic and current, and the degree to which its predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current available information about forest management, which may well have changed since the original information package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, such as the enactment of the Code, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case forecast. Judgements that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

Timber supply analysis for the Bulkley TSA

The base case harvest forecast presented in the *April 2001 Bulkley Timber Supply Area Analysis Report* incorporated the most current available information on current forest management, land base and timber yields for the TSA. It included specific assumptions about the TSA that are discussed in detail in the analysis report.

In this rationale, I will discuss many of those analysis assumptions in the context of my considerations for this AAC determination. However, where my review of an assumption has concluded that I am satisfied it was appropriately modelled in the base case of the timber supply analysis, I will not discuss my considerations in detail in this document, other than to note my agreement with the approach that is already documented in the timber supply analysis report. Some factors for which the assumptions were appropriately modelled in the analysis may warrant discussion. However, for other reasons, such as new information, lack of clarity in the analysis report, or concerns resulting from the previous

determination for the Bulkley TSA, I may choose to provide my consideration of such factors in this rationale.

A 'base case' was generated which incorporated the factors appropriate to the TSA, and this base case was submitted for public review. In the analysis, 13 000 cubic metres per year issued to newly-issued or expanded woodlot licences were taken into account. As a result, the base case initial harvest level was set at 882 000 cubic metres per year, rather than the current AAC of 895 000 cubic metres.

The base case harvest forecast projected that the initial harvest level of 882 000 cubic metres per year could be maintained for one decade followed by reductions over the subsequent four decades of approximately 10 percent per decade to the long-term harvest level of 554 945 cubic metres per year.

The long term harvest level projected in the base case in this timber supply analysis is greater than that projected for the first timber supply review for the Bulkley TSA. Factors contributing to this difference include an increase in the timber harvesting land base due to the refinement of the land classification system and to a re-inventory and use of managed stand yield curves. Factors that changed since the last review that tended to reduce the availability of timber include changes in forest cover objectives due to the LRMP and an increase in land base reductions for riparian reserves and management zones due to the Forest Practices Code.

There were specific considerations consistent with current timber supply review policies which led to the choice of the 2001 base case harvest forecast. These considerations included establishing an initial harvest level at the current AAC, as well as providing for an orderly transition from harvesting existing natural stands to future managed stands. The alternative harvest forecasts that were considered are discussed later in this document.

I have considered the reasoning used to select the base case harvest forecast, and I am satisfied that it provides a suitable basis from which to evaluate the assumptions regarding land base, management practices and timber yields for the Bulkley TSA. I have also considered all public input received on the data package and analysis report, and where appropriate I discuss these in my considerations under the various factors presented in this rationale.

Consideration of Factors as Required by Section 8 of the *Forest Act*

Section 8 (8)

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

Land base contributing to timber harvesting

- general comments

As part of the process used to define the timber harvesting land base in the timber supply

analysis, a series of deductions are made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest, for ecological, economic or social reasons. In the Bulkley TSA, the deductions (summarized in table 2 of the *April 2001 Bulkley Timber Supply Area Analysis Report*) result in a timber harvesting land base of 339 874 hectares, or approximately 68.5 percent of the Crown productive forest land.

I have considered all of the deductions applied in the derivation of the timber harvesting land base for the Bulkley TSA. I accept the assumptions applied in the analysis for the problem forest types and new protected areas factors and do not discuss them any further. The factors discussed below are those for which I believe my considerations require some detailed explanation.

- physical and economic operability

Harvest method mapping (HMM) was the outcome of a 1997 provincial Data Analysis Working Group pilot project in which the district participated. The main goal was to classify operability in terms of applicability of harvesting system, using primarily information from the forest inventory file, to help derive a provincially consistent way of defining operability. The other goal of the project was to compare this operable landbase against that defined by existing total chance planning (TCP) maps, to determine if HMM reasonably represents current practice as reflected by the TCP. The HMM operable landbase, when compared against the TCP operable landbase in the Telkwa Landscape Unit, was found to be 8 percent larger than the TCP landbase, primarily as a result of the inclusion of certain low productivity sites. However, as discussed in the next section, "low productivity sites", much of this area should have been excluded from this analysis. Therefore, the HMM approach appears to reflect actual operability in a reasonable manner. In the timber supply analysis, 348 hectares were considered physically inoperable, and 7 388 hectares and 31 320 hectares were deducted for economically inoperable helicopter and cable areas, respectively, based on the HMM.

PIR questioned why the sawlog quality stands from the helicopter areas were removed from the timber harvesting land base when they have heli-logged many areas over the past five years. The district's response was that the analysis was based on a data package completed in 1997, and very little activity in heli-sawlog types was occurring at that time. I agree that it is reasonable to include 1600 hectares of heli-sawlog types (based on the HMM analysis) in the timber harvesting land base because of the increase in heli-logging activity. This results in a small upward pressure on timber supply both in the short and long term, and I have accounted for this in my decision as discussed in 'Reasons for Decision'.

During the HMM project, an unmapped subzone phase was discovered, the ESSFu – upper forested, that is likely not harvestable and has significant reforestation problems. A new ecological classification and BEC guide insert has been developed to describe this variant, and once the variant is fully mapped it will be excluded from the operable land base. This may result in a very slight downward pressure on timber supply, but most of the ESSFu is currently not in the operable land base. What little of the ESSFu that is in the operable land base is mostly low productivity and is removed as per the Low productivity sites factor, discussed next.

I urge the district to continue refining the operable land base for the TSA for future timber supply analyses.

- low productivity sites

In the analysis, 44 551 hectares of Crown forested land were removed because they are classified as low productivity sites based on the HMM, i.e., sites with insufficient volume for economically feasible harvest, or those stands that are unlikely to achieve a harvestable volume over time. During the HMM/TCP comparison (discussed in the previous section, "physical and economic operability"), it was noted that certain mature stands of very low site index were included in the operable landbase if low productivity volume, height, and diameter limits were exceeded. These stands would have been removed in the timber supply analysis from the 1995 AAC determination based on their site class. Subsequent to the analysis being conducted, district staff determined site classes using site index ranges specified by the Growth and Yield section of the former Resources Inventory Branch, Ministry of Forests. This resulted in the identification of an additional 20 763 hectares of low productivity sites (i.e. site index is less than 8 metres) that were inadvertently included in the timber harvesting land base of the current analysis. Harvesting in this type amounted to approximately 2.4 percent of the total area harvested within the past five years, so 20 265 hectares of this additional area was recommended for removal from the timber harvesting land base. In addition, 1 854 hectares of stocking class 2, 3, and 4 types were recommended for removal because of a lack of harvesting activity in these types, bringing the total to 22 120 hectares. Based on the results of a sensitivity analysis, I conclude that this reduction to the timber harvesting land base results in a downward pressure on timber supply of about 2.4 percent in the short and long term, and I have accounted for this in my decision as discussed in 'Reasons for Decision'.

Other work done in the TSA on site productivity indicates that site productivity is often underestimated. This work is discussed further under Expected rates of growth, site productivity. However, in this case the sites tend to be higher elevation and are likely to be truly of low productivity, so I accept the proposed reductions.

- environmentally sensitive areas

Use of Terrain Stability Mapping (TSM) for identifying Class IV and V terrain (i.e. unstable terrain) is a superior alternative to ESA mapping for sensitive soils. Unfortunately, TSM was only available for the Copper Landscape Unit at the time of data collection, although now it has been completed for most of the TSA. The result of this mapping for the Copper landscape unit cannot be extrapolated to other areas of the TSA since the Copper landscape unit is more unstable than much of the rest of the TSA. For the remainder of the unit, I accept ESA mapping as the best available information. I encourage full use of TSM in the next round of the timber supply review.

Based on my review, I am satisfied that the base case adequately accounts for environmentally sensitive areas as mapped in the TSA.

- roads, trails and landings

In the analysis, a percentage of the productive forested area was excluded to account for the permanent loss of productive land to roads, trails and landings. Separate estimates are made for existing and future structures, to reflect both potential changes in road building practices and road network requirements over time.

I am satisfied with the assumptions made for existing roads, trails, and landings and with the way they were modelled.

For future roads, trails, and landings, however, I am concerned that the methodology does not account for the possibility of better forest practices that reduce the impact of roads, trails, and landings on the timber harvesting land base. In addition, the silviculture prescriptions upon which estimates of future roads, trails, and landings were based assumed that the highest allowable level of disturbance would occur; actual levels of disturbance may be less. This would primarily affect timber supply by a small amount in the long term, as discussed further under 'Reasons for Decision'. I encourage the refinement of the methodologies in future TSRs.

- agricultural land reserve (ALR)

Since the last TSR, Cabinet approved an LRMP for the Bulkley TSA which created an agriculture/wildlife zone comprising of 4 841 hectares of area with combined high agricultural capability and high-value wildlife habitat. In the analysis, it was assumed that all of this area would be harvested and converted to agricultural use within 60 years, and that after 60 years, this area no longer contributes to the timber harvesting landbase. The staff from the former Ministry of Environment, Lands, and Parks believes a more objective assumption would be that half of the area is harvested because it was the intent of the LRMP that wildlife considerations would result in some land not being converted into agricultural crop. I agree that this is a reasonable consideration and I believe that this could cause a slight downward pressure to the timber supply in the short term. However, given the relatively small area involved, the impact will likely be small (less than 1 percent in the long term and even less in the short term). Therefore, I agree that management of the ALR was not quite correctly modelled, resulting in a small unquantifiable downward pressure in projected timber supply. I discuss this further under 'Reasons for Decision'.

- woodlots

As a result of a Woodlot Licence expansion program intended to triple the number of woodlot licences in the TSA, the district has issued 11 new woodlot licences and expanded 4 others since the last AAC determination. Woodlot licences occupy 8 251 hectares of Crown land and their apportionment is 13 000 cubic metres per year. The starting volume for the base case was set at 882 000 cubic metres to account for the area and volume now administered under woodlots. In the analysis, only 7 985 hectares were removed for woodlot licences, which is 266 hectares less than it should have been. Removal of this additional 266 hectares creates a downward pressure on timber supply, acting in both the short term and long term. I will account for this over-estimation of the timber harvesting land base under 'Reasons for Decision'.

Existing forest inventory

The inventory data used for the timber supply analysis is based on a forest inventory conducted in 1995-1997 using 1993 aerial photographs. For the timber supply analysis, the inventory attributes were re-projected to 1998, but the depletions were current to winter of 1993/1994.

I have considered the information about the forest inventory, and am satisfied that the best available information was used in the analysis. I note, however, that this determination occurs seven years into the first decade of the analysis horizon at least in terms of depletion, and that the short-term timber supply may be more sensitive to those factors exerting either downward or upward influences than suggested by the various sensitivity analyses.

With respect to age class structure and species profile, I have considered the information and am satisfied that they do not constrain timber supply. These factors will not be discussed further in this document.

For the factor discussed below, my considerations require some detailed explanation.

- volume estimates for existing stands

An inventory audit for the Bulkley TSA was completed in 1995 but because the audit was conducted on an earlier inventory the results were not directly applicable to the new inventory. The field audit samples were re-compiled and applied against the new inventory volume estimates. At 12.5+cm diameter at breast height utilization, the audit volume was 36 cubic metres per hectare (12.2 percent) less than the inventory volume. This difference was statistically significant at the 95 percent confidence level. At 17.5+cm diameter at breast height utilization, the audit volume was 25 cubic metres per hectare (8.8 percent) less than the inventory volume. This difference was not statistically significant at the 95 percent confidence level. Since short term timber supply is affected by volume estimates of existing stands, I requested further analysis be done on the audit data. Consequently the data were re-compiled with new BEC-based taper and loss factors, a mixed utilization standard (12.5+cm diameter at breast height for predominantly pine stands, 17.5+cm diameter at breast height for other species – the utilization standards used in the base case were 12.5+cm diameter at breast height for predominantly pine stands and 15+cm diameter at breast height for all other stands), and stratification by sawlog and marginal sawlog/pulpwood. The results of this new analysis indicate that the difference between the audit and inventory volumes for the entire TSA are not different, and the two in fact are within 3 percent of each other. The volume in the sawlog component is overestimated by about 7 percent and the volume in the marginal sawlog/pulpwood component is underestimated by about 19 percent. However, neither of these differences are statistically significant at the 95 percent confidence level and I conclude that for this decision the inventory estimates for existing stand volumes are reasonable to use. Since about 60 percent of the volume harvested is in the sawlog type, I urge timely completion of the second phase of the ongoing vegetation resources inventory in the Bulkley TSA so that more accurate information can be used in future AAC determinations.

Expected rate of growth

I have considered the information regarding the assumed volumes for existing and future managed stands, including the various operational adjustment factors applied to volume estimates, age to green-up, and to the minimum harvestable ages. I am satisfied that the analysis assumptions were appropriate for these factors, and I will not discuss my considerations in detail in this rationale.

My considerations require some detailed explanation for the following factor.

- site productivity estimates

Inventory data includes estimates of site productivity for each forest stand. Site productivity is expressed in terms of a site index, which is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow, which in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the age at which a stand will reach a merchantable size.

In general, in British Columbia, site indices determined from younger stands (i.e. less than 31 years old), and older stands (i.e. over 150 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in several areas of the province where studies — such as the Old-Growth Site Index (OGSI) 'paired plot' project, the 'veteran' study, as well as one local study, Operational Adjustment to Site Index Study (OASIS), which combines random sampling for site series with the Site Index Biogeoclimatic Ecosystem Classification System (SIBEC) — suggest that actual site indices may be higher than those indicated by existing data from old-growth forests. Such studies indicate that site productivity has generally been underestimated by the inventory data; managed stands tend to grow faster than projected by inventory-based site index estimates from old-growth stands.

Sensitivity analysis was used to assess the impact on timber supply if site productivity is underestimated to the extent suggested by the OGSI and OASIS studies. In the sensitivity analysis for the OGSI study, the site indices of all stands older than 140 years of age were adjusted using the provincial OGSI data. For Douglas-fir, lodgepole pine and interior spruce, adjustments were based on paired plot data; for all other species, adjustments were based on veteran tree study data. The sensitivity analysis results indicate that beginning in decade four, mid- and long-term timber supply could be as much as 32 percent greater than indicated in the base case projection, if the provincial OGSI site productivity adjustments were applicable to the stands in the Bulkley TSA. In the sensitivity analysis for the OASIS study, the site indices of all stands (not just old-growth stands) were adjusted. The sensitivity analysis results indicate that beginning in decade four, mid- and long-term timber supply could be as much as 37 percent greater than indicated in the revised base case projection, if the provincial OASIS site productivity adjustments were applicable to the stands in the Bulkley TSA. In both of these sensitivity analyses, minimum harvestable ages

and green-up ages were adjusted to account for the increased site productivity.

PIR encourages the use of the OASIS results, and notes that growth in the coastal transition zone is higher than in the interior zone, contrary to a statement in the data package. District staff agree that site productivity is likely underestimated by the site indices from the inventory in the Bulkley TSA, and that growth is faster in the coast transition zone. Observations of regenerating stands indicate much better growth than would be suggested by the site indices attributed to the older stands. However, there is some question about the reliability of some of the SIBEC data in the OASIS study. Both the OGSI and the OASIS studies show similar results, which tends to remove some uncertainty. A sensitivity analysis shows that there is no impact to timber supply in the short term. I see a need to improve the data for future AAC determinations. I will discuss my considerations of this further under 'Reasons for decision'.

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

Expected time for forest to be re-established following harvest

I have reviewed the information regarding regeneration delay and not-satisfactorily-restocked areas, and I am satisfied that the assumptions in the base case for these factors were appropriate.

My consideration for the following factor, however, requires some detailed discussion.

- genetic gain

Genetically improved planting stock has been used in the Bulkley TSA since about 1995. The proportion of genetically improved seedling being planted is expected to peak in about 2005 at a level of 80 percent of the total program. It will never reach 100 percent due to the planting of small amounts of balsam, amabilis fir, and western hemlock seedlings which are grown from wild seed. Increased growth due to genetic gain varies by individual seedlot, but levels up to 15 percent have been estimated. Genetic gain was not modelled in the base case. However, an average genetic gain of 5 percent was modelled in a sensitivity analysis, which resulted in a 3.8 percent increase in the long term harvest level. Since genetic gain should only be applied to 80 percent of the planted trees, the long term harvest level would only increase by about 3 percent in the long term. I am accounting for this increase as discussed further under 'Reasons for Decision'.

(iii) silviculture treatments to be applied to the area,

Silvicultural treatments to be applied

I have reviewed the information regarding incremental silviculture, the Bulkley Silviculture Strategy, and the reforestation of high elevation sites, and I am satisfied that the base case assumptions for these factors were appropriate.

My consideration for the following factor, however, requires some detailed discussion.

- silviculture systems

Silviculture systems in the Bulkley TSA are at present primarily clearcut with reserves (individual or groups of mature trees). There is a fairly high degree of advanced regeneration, saplings, and poles in harvested blocks, consisting of mainly balsam, with small amounts of spruce and hemlock. The presence of reserves does not affect the growth performance of regeneration on these areas. Hence, existing even-aged models are appropriate for projecting the volumes of these stands in the timber supply analysis. However, on sites with advanced regeneration there may be differences in the following factors:

- a truncated or even eliminated regeneration delay period leading to an earlier harvest,
- protection of the new regeneration from harsh environments and the potential of increased survival and growth,
- alleviation of visual (VQO) and/or adjacency constraints, and
- achievement of green-up at an earlier time.

Advance regeneration results in no regeneration delay and sites where this occurred were modelled appropriately in the base case. This was approximately 2 percent of the timber harvesting landbase. However, practices have changed since the data package was released and the district concludes that under current practices, approximately 15 percent of all harvested area is retaining some sort of advance regeneration. Because advanced regeneration also affects green-up, this results in an unquantified upward pressure in the short term harvest level. An unquantified upward pressure in the long term harvest level may be realized from the reduced regeneration delay and subsequent earlier harvests.

I encourage the district to study and assess the modelling techniques and continue to collect data and monitor advance regeneration. I will account for the impact of advance regeneration on timber supply under 'Reasons for Decision'.

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

Timber utilization

- utilization; decay, waste, and breakage

Historic TSA-specific utilization standards (12.5+cm diameter at breast height for predominantly pine stands and 15+cm diameter at breast height for all other stands) were used in the base case. However, provincial utilization standards (12.5+cm diameter at breast height for predominantly pine stands, 17.5+cm diameter at breast height for other species) were accepted for the Bulkley TSA by the Regional Manager in March of 1999. The provincial utilization standard is in effect for 73 percent of the AAC, or 650 000 cubic metres. The remaining 27 percent, or 245 000 cubic metres, corresponds to licenses issued specifically in the marginal sawlog/pulp partition, which has stands of poorer-than-average wood quality. The management intent for these stands is better utilization of marginal quality wood, thus the more stringent Bulkley TSA-specific standards apply. A sensitivity analysis shows that if the provincial utilization standards were applied to all merchantable volume, then the long term timber supply would decrease by 4.3 percent. However, the

provincial utilization standards only apply to 73 percent of the merchantable volume, so I accept a 3 percent downward pressure in the short and long term timber supply. I will account for this in 'Reasons for Decision'.

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production,

Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

To manage for resources such as water quality and aesthetics, current harvesting practices limit the size and shape of cutblocks and amount of disturbance (areas covered by stands of trees less than a specified height), and prescribe minimum green-up heights for regenerated stands on harvested areas before adjacent areas may be harvested. Green-up requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

As described in the *April 2001 Bulkley Timber Supply Area Analysis Report*, several management zones were created and different forest cover objectives were applied to the stands in each zone. These management zones were developed to reflect different operational considerations.

I have reviewed the information presented to me regarding the analysis assumptions for recreationally significant areas, First Nations, community watersheds, riparian habitat, wildlife, stand-level biodiversity, and landscape-level biodiversity, and I am satisfied that the analysis has appropriately reflected operational constraints within these areas. I am also satisfied that, with the exception of areas noted in the following sections, the assumptions regarding these factors in the analysis are consistent with the Bulkley Higher Level Plan Order. As a result, I will not discuss my considerations of these factors any further within this rationale document. The factors discussed below are those for which I believe my considerations require some detailed explanation.

- cutblock adjacency/green-up

Objectives for forest cover and cutblock adjacency guide harvesting practices in order to address resource values such as wildlife, water, and visual quality. The adjacency objectives modelled in the analysis address minimum green-up height required before an adjacent area may be harvested, and the maximum area permitted to be less than the minimum green-up height. The FSSIM timber supply analysis model does not represent adjacency objectives explicitly. Rather, in timber supply analysis adjacency is modelled implicitly through a forest cover objective which limits the amount of area on which trees may be below a specified green-up height.

For the analysis, green-up based forest cover objectives were applied to IRM areas, moderate value grizzly habitat in the Babine Lake landscape unit, retention VQO's, and partial retention VQO's. The constraints modelled for VQO's and grizzly habitat reflect HLP objectives, so they are reasonable. However, forest management in the IRM zone is not currently subject to green-up/adjacency constraints. Rather, new HLP objectives specify seral stage and patch size distribution targets, designed to attain a pattern of development across the landscape that is representative of natural disturbance types. Seral stage targets were modelled in the analysis but patch size distribution targets were not modelled. A patch size analysis done by the district Forest Ecosystems Specialist to monitor whether HLP objectives for patch size distribution were being met reveals the management to patch size targets allow greater operational flexibility around adjacency in the short term than reflected in the base case. This flexibility is attained because small openings in the IRM zone can be amalgamated into larger blocks without the restriction of green-up/adjacency constraints that ordinarily require openings to achieve green-up prior to harvesting of adjacent leave areas. Since the IRM zone comprises 61 percent of the timber harvesting land base, and timber supply is constrained by the time taken to achieve green-up, there will be a net upward pressure on timber supply in the short and medium term when green-up constraints are removed, but this is not currently quantifiable. I will take this into account as discussed under 'Reasons for Decision'. I recommend further refinement and analysis of this factor to improve future AAC determinations.

- visually sensitive areas

The scenic resources of the Bulkley TSA are important to the tourism / recreation sector and to the quality of life of area residents. The LRMP outlines specific area and specific viewpoints, and directs visual quality in these areas and from these viewpoints to be managed through landscape unit planning.

The data package was completed in June of 1998 and did not include VQO's for any area except for around Babine Lake, as VQO's could not be considered current management at that time. In September 1999, comprehensive Landscape Unit Plans were signed off by the District Manager as District Manager policy. These include objectives for the management of visual quality for those areas and viewpoints identified in the LRMP, and managing visual quality according to the LRMP is now current management in the TSA.

A sensitivity analysis shows that the effect of including VQO's at the maximum limit of allowable visible disturbance recommended by provincial policy results in a reduction in the long term harvest level of 4.3 percent. I take this into account under 'Reasons for Decision'.

- LRMP special management zones

The Bulkley LRMP designates two types of special management zones (SMZ's): SMZ 1 which allows no commercial timber harvesting, and SMZ 2 which allows commercial timber harvesting with some restrictions. All SMZ 1 zones have been excluded from the timber harvesting land base in the base case analysis. All SMZ 2 zones were treated the same as IRM zones in the base case analysis, except for forest cover constraints for visual quality. For the Babine River SMZ 2, restrictions from the LRMP and Babine LUP were covered in the base case through the use of forest cover constraints. Except for the

Reiseter Creek SMZ 2, all other SMZ 2's have been accounted for in the base case through forest cover constraints for core ecosystems and landscape corridors.

Current management in the Reiseter Creek SMZ 2 has changed since the analysis was completed. The Bulkley LRMP stated that only low impact, low intensity logging would be allowed. The definition of low impact, low intensity, which was discussed extensively by the Community Resources Board, Forest Service staff, and the licensee, resulted in:

- areas classified as Es 1's being increased by 564 hectares,
- riparian reserve zones being increased by 393 hectares,
- a requirement for not more than 15 percent of the land base to be less that 5 metres tall (27 year green-up) and for a 180 year rotation, and
- only 5 percent of the land base being logged every 5 years.

In the district's assessment, there is enough flexibility in these conditions that there will be no constraints to timber harvest in the first 10 years. However, the reduction of 957 hectares may impact the short to long term timber supply by 0.3 percent. I take this into account under 'Reasons for Decision'.

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

Bulkley Higher Level Plan Order

Portions of plans arising from strategic land use planning processes such as regional or subregional planning (land and resource management planning) may be declared as higher level plans under the Forest Practices Code. A higher level plan defined under the Forest Practices Code establishes government's social, economic and environmental objectives, thereby setting the resource management context for developing subsequent operational plans.

For the Bulkley TSA, the Bulkley LRMP was approved by government in April, 1988. In November of 1988, a full set of biodiversity objectives for 12 landscape units in the Bulkley TSA were established by the District Manager and Designated Environmental Officer. The Bulkley Higher Level Plan Order was established by government in December 2000.

The majority of the recommendations arising from the LRMP, and also contained within Landscape Unit Plans, that are relevant to operations and timber supply have been implemented in the Bulkley TSA and are considered current practice. As discussed previously in this document, the timber supply analysis assumptions for wildlife habitat, landscape level biodiversity, riparian habitat, watersheds, visual quality and other IRM values were consistent with the recommendations of the LRMP.

I believe that this period following the establishment of the Bulkley LRMP by government will provide greater clarity around the management for specific resource values in the Bulkley TSA. If management considerations for specific values become less or more constraining than those that guide current practice, then this can be factored into a future determination.

- harvest profile/partition

My 1995 AAC determination for the Bulkley TSA set the AAC at 895 000 cubic metres and it was partitioned according to the timber quality profile in the TSA. The AAC was partitioned at 528 000 cubic metres to be harvested from stands defined as sawlog and the remainder, 367 000 cubic metres, was to be harvested from stands defined as marginal sawlog or pulpwood stands. The licencees have operated in accordance with the target percentages for profile cut on replaceable forest licences and timber sale licences. Harvest of the full partition of pulp/marginal sawlog has not been realized due to market conditions.

I still see the need to maintain a partition for this determination. I will keep the current partition proportion, resulting in a partition of 520 000 cubic metres from sawlog stands and 362 000 cubic metres from marginal sawlog/pulpwood stands. These new values include an adjustment in the total AAC to reflect all recently issued woodlots.

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

Alternative rates of harvest

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large volumes of older forests often permits harvesting above long-term levels without jeopardizing the sustainability of future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and medium-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

Several harvest forecasts are possible for the Bulkley TSA, given the current management regime and assumptions made in the analysis. The assumptions for these options are discussed in detail in the *April 2001 Bulkley Timber Supply Area Analysis Report.*

Under these assumptions, it was possible to achieve two decades at the current AAC as shown in the analysis report. Compared to the base case, this option results in lower total growing stock projections from decade 3 to the end of the planning horizon. It is also possible to reduce the harvest level by 10 percent immediately and hold it for three decades before declining by 10 percent per decade for three decades to the long term harvest level.

The base case analysis reflected harvest flow guidelines developed for timber supply analyses which seek to maintain the current AAC if possible while allowing gradual declines in future harvest levels, and ensuring the attainment of maximum long-term harvest levels.

I have reviewed the alternative harvest forecasts provided, and I am satisfied that the harvest flow selected for the base case provides a suitable basis from which to evaluate the assumptions applied in the analysis.

Community implications

I have reviewed the information presented in the socio-economic analysis for the Bulkley TSA, and I am aware of the implications to communities of changes in the harvest levels for the TSA. I would also like to note that, historically, the Bulkley TSA has had a net inflow of wood from other TSA's.

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

Timber processing facilities

I have reviewed the information regarding timber processing facilities, and I am aware of the reliance of timber processing facilities on the timber harvested in the Bulkley TSA.

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia,

Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). The letter and memorandum include objectives for forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability." He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

I have considered the contents of the letter and memorandum in my determination of an AAC for the Bulkley TSA.

Local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives. Many public responses were received to the information report and data package, and to the timber supply and socio-economic analyses. The summary of public input is reproduced in full as Appendix 5.

The Bulkley LRMP, the intent of which forms current practice in the Bulkley TSA and has been accounted for in this determination, was approved after public dialogue and negotiation. Bulkley Landscape Unit Plans provide further clarification for some objectives as they continue to be interpreted and implemented.

Local objectives have been an important consideration in my determination of an AAC for the Bulkley TSA. I have considered all public input received on the timber supply review, and where appropriate I have responded to this input in this rationale.

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Unsalvaged losses

I have reviewed the analysis assumptions regarding unsalvaged losses due to windthrow, wildfire, and the spruce budworm in the Bulkley TSA. I am satisfied that these losses were appropriately accounted for in the harvest projections.

Other loss agents require further discussion. I was advised by district staff that several of the loss estimates (described below) used in the timber supply analysis should be revised. These revisions were recommended partly as a result of public input, which raised specific questions, and partly as a result of additional work carried out since the timber supply analysis was conducted.

In particular, district staff concluded that where loss estimates have been developed based on existing stands, it is unreasonable to apply them to future managed stands. Staff argued that future losses will be lower for the following reasons:

- earlier intervention of future insect and disease outbreaks due to an increased knowledge of pest behaviour and improved detection techniques will lead to less volume being damaged and more damaged volume being salvaged;
- salvage will likely increase as access throughout the district improves;
- higher use of pest prevention strategies (such as introducing species diversity); and
- future harvest ages will likely be younger, before trees become susceptible to mature stand pests such as bark beetles.

As the timber supply analysis assumed the same annual losses for existing and future stands, reduced loss estimates for future managed stands will result in an upward pressure on long-term timber supply.

Other loss estimates reviewed by the district, along with the Regional pathologist and entomologist—for mountain pine beetle, spruce bark beetle, balsam bark beetle, and tomentosus root rot—have both short- and long-term implications. Specifically:

- spruce bark beetle loss estimates, currently at zero, should be increased (with larger estimates in the short term and smaller estimates in the long term), resulting in an overall downward pressure on timber supply;
- revised balsam bark beetle and tomentosus root rot loss estimates create an upward pressure on short-term timber supply; and
- revised loss estimates for mountain pine beetle, balsam bark beetle, and tomentosus root rot create an upward pressure on long-term timber supply.

I have reviewed the methodology used to produce the original and revised estimates for the unsalvaged losses discussed in this section. I acknowledge that while there are reasonable explanations for the suggested revisions, there is also considerable uncertainty about their

magnitude. Therefore, I accept the revised loss estimates but with some caution. I strongly encourage district staff to continue to review these estimates and the data on which they are based.

For this determination, I interpret the above information as indicating an insignificant upward pressure on short-term timber supply (less than 0.1 percent) and a slight upward pressure of at least 3 percent on long-term timber supply. I view the 3 percent value as a *minimum* upward adjustment. This is because no revised estimates were provided to me for balsam bark beetle losses in future managed stands, and therefore this remains an unquantified upward pressure.

Reasons for Decision

In reaching my AAC determination for the Bulkley TSA, I have considered all of the factors presented to me, and I have reasoned as follows.

A base case prepared as part of the timber supply analysis projected that the initial harvest level of 882 000 cubic metres per year could be maintained for one decade, before beginning a series of declines to a long-term harvest level of 554 945 cubic metres per year by decade 5.

Section 8 of the *Forest Act* requires me to consider a number of factors in the determination of an AAC for a timber supply area. In determining an AAC, my considerations identify factors which, when considered separately, indicate that the timber supply may actually be greater or less than that projected in the base case. Some factors can be quantified and their impacts assessed with some reliability. Others may influence timber supply by introducing an element of risk or uncertainty to the decision, but cannot be reliably quantified at the time of the determination.

I am satisfied that the assumptions applied in the base case of the analysis for the majority of the factors applicable to the Bulkley TSA were appropriate. Following is my consideration of those factors for which I consider it necessary in this determination to take into account implications to the timber supply projected in the revised base case.

Factors which indicate that the timber supply projected in the revised base case may be underestimated, and to a degree that can be quantified are as follows:

1) *operability* – Including 1600 ha of heli-sawlog harvesting into the timber harvesting land base results in the timber supply being higher by about 0.3 percent throughout the forecast horizon;

2) *genetic gain* – Modelling the current practice of using of class A seed shows that timber supply may be about 3 percent higher in the long term;

3) *unsalvaged losses* – Unsalvaged losses were overestimated and hence timber supply is probably higher by 0.1 percent in the short term and by at least 3 percent in the long term.

Factors which indicate that timber supply projected in the base case may be underestimated, but to a degree that cannot be well quantified, are as follows:

1) *site productivity* – The site productivity of second growth forests is underestimated by site index measurements taken from existing old growth forests, although the effect on timber supply of this underestimation is uncertain and could be as high as 37 percent;
2) *roads, trails, and landings* – A small (approximately 1 percent) upward pressure on long term harvest level exists due to an overestimate of area in future roads, trails, and landings;
3) *green-up* – I accept that management of patch size distribution rather than green-up constraints should be applied to the IRM zone (approximately 61 percent of the THLB), which gives flexibility in locating harvest blocks mainly in the short term but also in the mid to long term;
4) *silviculture systems* – Properly accounting for advance balsam regeneration indicates that there will be an upward pressure on projected short and long term timber supply.

In addition to those factors which indicate that timber supply may be underestimated in the revised base case, I have also identified a number of factors which indicate that the base case harvest projection likely overestimates timber supply, as follows:

1) *low productivity sites* – An additional 22 120 hectares should be removed from the timber harvesting land base, resulting in a 2.4 percent decrease in projected timber supply throughout the forecast horizon;
2) *woodlots* – Two hundred and forty-four ha of woodlot was not accounted for, which results in a 0.08 percent decrease in projected timber supply throughout the forecast horizon;
3) *decay, waste, and breakage* – Changing to the provincial utilization standards results in a 3 percent decrease in projected timber supply in the short and mid term;
4) *VQO's* – An increase in area declared as visually sensitive leads to a 4.3 percent decrease in projected timber supply throughout the forecast horizon;
5) *LRMP special management zones (Reiseter Creek plan)* – A removal of 957 ha from the timber harvesting land base due to unstable soils and riparian reserves results in 0.3 percent decrease in projected timber supply throughout the forecast horizon.

The following factor indicates that timber supply projected in the base case may be overestimated, but to a degree that cannot be well quantified:

1) *agricultural land reserve* – The ALR assumptions may be overly optimistic with respect to how much of this zone can be harvested, but the resulting pressure on short and medium term timber supply will be small.

While I am aware of the timber supply implications of each of these factors on its own merits, I acknowledge the difficulties associated with assessing their cumulative effect on the base case harvest projections. As a result, I requested that an additional analysis be completed to provide me with an assessment of the interaction of the factors.

The additional analysis includes the following adjustments to the assumptions as compared to the assumptions applied in the base case:

- *site productivity* – the results of the OGSI project were used to adjust site productivity estimates;
- *utilization* – provincial utilization standards were applied;
- *visually sensitive areas* – forest cover objectives were placed on all VQO areas, not just the Babine Lake area;
- *genetic gain* – assumed a genetic worth of 5 percent on 80 percent of all regenerated spruce and pine plantations;
- *unsalvaged losses* – adjusted the NRLs to be 67 935 cubic metres in the short term and 51 035 cubic metres in the long term;
- *volume estimates for existing stands* – allowed for 7 years of harvest depletion at an average rate of 731 200 cubic metres per year, which reflects historical harvest levels;
- *low productivity sites* – 25 618 hectares of low-site balsam leading stands were removed from the timber harvesting land base.

The results of this additional analysis indicate that a declining harvest flow similar to that of the base case (starting at 882 000 cubic metres per year for the first decade) can be maintained for the first four decades. Harvest levels are slightly higher in the mid-term and significantly higher in the long term.

Having reviewed all of the information, I am satisfied that an appropriate harvest level for the Bulkley TSA at this time is 882 000 cubic metres per year.

Determination

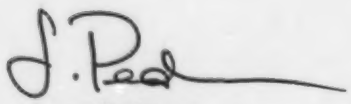
I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in the Bulkley TSA by establishing an AAC of 882 000 cubic metres. I am setting the new partition at 520 000 cubic metres for sawlog stands and 362 000 cubic metres for marginal sawlog/pulpwood stands.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the five years required by legislation.

Implementation

In the period following this decision and leading to the subsequent determination, I encourage BCFS staff to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this rationale document. I recognize that the ability of staff to undertake these projects is dependent on available staff resource time and funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Bulkley TSA. I recommend that district staff:

- Continue to refine operability lines with the harvest method mapping approach;
- Replace environmentally sensitive soils (Es description) mapping with terrain stability mapping;
- Further refine methodologies for future roads, trails, and landings to account for rehabilitation and better forestry practices;
- Improve site index information for the OASIS approach to estimating site index;
- Continue to study and assess the modelling techniques for understorey retention, and to continue to collect data and monitor advanced balsam growth;
- Further refine and model the HLP objectives for seral stage and patch size distribution targets for future TSRs;
- Do a comprehensive review of the methods and results for accounting for unsalvaged losses;
- Consider developing utilization standards specific to harvest in stands with epidemic levels of balsam bark beetle infestation.



Larry Pedersen
Chief Forester

November 26, 2001

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the Forest Act, Revised Statutes of British Columbia 1996, reads as follows:

Allowable annual cut

8. (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

(iii) silvicultural treatments to be applied to the area,

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

(a) encourage maximum productivity of the forest and range resources in British Columbia;

(b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

(c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;

(d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and

(e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996

Appendix 5: Summary of Public Input

File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of
British Columbia

Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,

Andrew Petter
Minister

Province of British Columbia
Ministry of Forests
OFFICE OF THE MINISTER

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: **The Crown's Economic And Social Objectives Regarding Visual Resources**

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

.../2

In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis*.

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

Andrew Petter
Minister of Forests

Bulkley Timber Supply Area
Timber Supply Review

Summary of Public Input

BC Ministry of Forests
Bulkley/Cassiar Forest District
Bag 6000
3333 Tatlow Road
Smithers, BC
V0J 2N0

November, 2001

This is a summary of the public input received on the Timber Supply Review in the Bulkley Timber Supply Area. This summary does not assess the feasibility or validity of the input or whether it relates to the clearly defined mandate of the chief forester in the allowable annual cut determination.

Bulkley Timber Supply Area

Background

As part of the review of timber supply in the Bulkley Timber Supply Area (TSA), two opportunities were provided for public input. The first followed release of the Bulkley Timber Supply Area *Data Package* and *Information Report* in June 1998. The *Information Report* was a non-technical summary of the draft data and management assumptions that were to be applied in reviewing the timber supply for the Bulkley TSA. A 30-day review period, ending July 3, 1998, was provided for the public to comment on these documents.

On April 19, 2001, the British Columbia Forest Service released the *2001 Bulkley Timber Supply Area Analysis Report* and *Public Discussion Paper*. The public was encouraged to review and comment on the accuracy of the information in these documents and to provide additional information during the 45-day review period that ended June 4, 2001.

This report summarizes the input received during both public review periods. This information was provided to the chief forester for his consideration when he reviewed the AAC for the Bulkley TSA. The first section of this summary outlines the public review process implemented by the Forest Service, and describes the types of public input received. The second section summarizes the public input in sufficient detail to indicate the range of input received. The original submissions (with personal identifiers removed in accordance with the *Freedom of Information and Protection of Privacy Act*) can be reviewed at the Bulkley/Cassiar Forest District office.

Public Review Process and Response

Bulkley District staff actively solicited public input on the Timber Supply Review in the Bulkley TSA through the following actions:

- approximately 220 copies of the *Information Report* and of a letter advising of the availability of the *Analysis Report* were mailed to stakeholders in the TSA, including First Nations, licensees, local governments and environmental groups. Meetings or presentations were offered.
- the *Data Package* and *Analysis Report* were available at both the district office and the regional office in Smithers. About 30 copies of the *Data Package* and eight copies of the *Analysis Report* were picked up. Approximately ten copies of each were mailed out.
- newspaper advertisements were placed, advising of the availability of all documents for review by the public.
- copies of all the documents were made available to the local media. Interviews were conducted with the local radio and newspaper.
- on June 22, 1998, an open house was conducted at the Bulkley Forest District office in Smithers. Five people attended.
- presentations to the Bulkley Silviculture Committee were made on November 6, 1997, and April 25, 2001. Sixteen people were in attendance on each occasion.
- referrals were made to the Ministry of Forests website where documents were available to download.

The Bulkley Forest District received six written submissions on the *Data Package* and four submissions on the *Analysis Report* (see Appendix 1).

Public Input

In this section, public input on the information presented in the Timber Supply Review documents for the Bulkley TSA is summarized under the following headings:

- Data Package (and Information Report)
- Timber Supply Area Analysis Report
- Other comments

Data Package

Land Base Factors

The submission from Pacific Inland Resources (PIR) questions whether the private land portion of woodlots contributes to the operable land base in the analysis.

On the issue of defining the operable land base, staff from the (former) Ministry of Environment, Lands and Parks (MELP) said it's a flawed assumption that second-growth stands that develop after harvesting marginally economic forest types will yield merchantable volumes in the future, unless one is prepared to wait a very long time. The agency pointed to MacMillan Bloedel's announcement that their second-growth stands on slopes over 60 percent are not economic to harvest, and asks what analysis has been done to support the ministry's assumption that all marginal sites will yield merchantable volumes.

Two submissions express the hope that it has finally been accepted that all trees have value and no longer will deciduous species will be cut and left in piles to rot.

MELP said they cannot support the assumption that areas with agricultural potential will be harvested in their entirety within 60 years. This is not consistent with the Bulkley Land and Resource Management Plan (LRMP), according to MELP, and wildlife habitat considerations will result in some of this land not being converted to agricultural crop production. The agency says a more objective assumption would be a 50:50 split.

Environmentally Sensitive Areas (ESAs)

Two submissions say that ESAs should contribute to requirements for riparian habitat and biodiversity.

PIR notes additional areas that have terrain stability mapping which could be used in place of ESAs for sensitive soils.

On the topic of potentially unstable areas, MELP said maintaining root-wad holding capacity, associated with mature trees, will be important for these sites, as will maintaining site hydrology. MELP said partial cutting and extended rotations will likely need to be factored into the analysis for these sites.

Roads, Trails & Landings (RTLs)

Two submissions ask if the 6.1 percent reduction for future RTLs has been checked against actual field measurements of built roads.

PIR asks to review the data and procedure used to determine the reductions for RTLs and makes a number of comments on this topic:

- the average width of roads and trails appears excessive given the reduction of landing use and the utilization of hoes to build roads.
- roads inside blocks are planted to the road prism and trails are usually planted.
- PIR has rehabilitated 82 hectares of landings, which would reduce existing RTLs by two percent.
- future RTLs should be 4.5 to five percent of the remaining operable land base, not the total operable.
- a field survey may be required to determine RTL numbers.

Expected Rate of Growth

PIR questions the source of data for site indices used to define analysis units and says the results of the Bulkley district's OASIS (Operational Adjustment to Site Index Study) pilot project should be incorporated. The company questions the statement that similar growth is expected in both the Interior zone and Coastal transition zones, saying their experience shows a higher rate of growth in the latter.

PIR says the minimum harvestable age (MHA) for each analysis unit should not be restrictive and MHAs should be examined as a function of site index and density management in the sensitivity analysis, and possibly replaced by minimum diameter and volume criteria.

Regeneration and Silviculture

PIR says the regeneration assumptions (Table 15) should describe the initial density regime as total countable conifer stems per hectare. The company also says the negative-ten-year regeneration delay assigned to areas of natural subalpine fir advanced regeneration may be doubled to 20 years (reference cited).

PIR says the plan to space all the over-dense stands aged one to 20 years should be reviewed. The company says a priority list is required to determine the most effective treatment schedule, as some sites are not feasible to treat. PIR says the Bulkley Silviculture Strategy will provide direction.

Green-Up Requirements

PIR says that in operational terms green-up is more flexible than simply a three-metre requirement, and suggests a wording change to the *Data Package*.

Visual Quality Management

Two submissions point out that visual management does not mean hiding harvesting activities, but ensuring that those that occur in sensitive areas are not jarring to the eye.

Riparian Management

PIR says, based on their experience, there are significantly more S4 streams than S3 streams so the weighted average for reserve and management zone widths should be very close to S4 management requirements.

MELP said the riparian management zone reductions should be based on the *Biodiversity Handbook*, not current practices. The agency says professional discretion may result in smaller riparian reductions at times, but a consistent downward deviation would raise a riparian habitat protection question.

Biodiversity

PIR questions the significant increase in the amount of harvestable land tied up in Wildlife Tree Patches (WTPs) in the *Data Package* compared to the draft presented earlier and asks how the new numbers were derived. The company says in the Interior Cedar-Hemlock and Sub-Boreal Spruce zones, 75 percent of WTP requirements should be met outside the timber harvesting land base, as demonstrated by current practice.

A submission from MELP suggested a sensitivity analysis to examine the impact of meeting old-seral targets in low emphasis units immediately, rather than over three rotations.

PIR makes several technical points on the data and assumptions relating to landscape level biodiversity.

Unsalvaged Losses

PIR says the estimate of unsalvaged losses should be revised, given that some wood (dry sawlog and dry pulpwood) that is currently utilized and included in their cut control is not included in the forest inventory and may be counted as unsalvaged loss. The company provides harvest history figures to support their position.

MELP said the statement in the *Data Package* that "the western balsam bark beetle is recognized as the most serious threat to mature balsam stands" has no ecological validity. By attacking individual old trees, MELP said these insects play an important role in maintaining forest health and stand perpetuation through gap-opening successional processes.

Special Management Zones

A second submission from MELP said that since Special Management Zones are an approved management zone in the Bulkley LRMP, they should be part of the base case and not just be examined in a sensitivity analysis.

Bulkley Timber Supply Area

Socio-Economic Factors

Two submissions say the analysis must consider the long-term negative effects on tourism and recreation-based employment of maintaining or increasing the harvest rate. They also say using employment figures per 1000 cubic metres may not be a very reliable guide to estimating future employment, and suggest that extrapolating from the historical downward trend in employment might be more reliable.

Two submissions note that wages in the resource sector are higher than the provincial average wage and thereby provide a greater social benefit through higher taxes paid and more disposable income (generating a greater multiplier effect). They say limited job losses could be expected from an AAC reduction, but the average annual wage will go down due to a reduction in the harvest season, and taxes paid and disposable income will decline. These submissions also attribute much of the reduction in local logging and milling activity to high stumpage rates and ask how a constraint imposed by government is handled.

Two submissions say it is not logical to consider the timber requirements of proposed processing facilities when the effects of land claims and forest management objectives not yet implemented are excluded from consideration. They say it's unacceptable that facilities should be proposed, let alone given consideration, until the AAC has been determined and it is shown that existing facilities are inadequate.

Timber Supply Area Analysis Report

Land Base Factors

PIR asks why all heli-sawlog types are removed from the timber harvesting land base when PIR and the Small Business program have heli-logged many areas over the past five years.

Regeneration Factors

With regard to the statement that marginal stands are planted to spruce and pine after harvesting, PIR says their planting program has averaged more than 15 percent subalpine fir for the past five years, supplemented by the retention of pole- and sapling-size balsam stems, particularly at higher elevations.

Non-Timber Values

On the topic of green-up requirements, PIR says it is their understanding that patch size distribution and seral stage objectives and strategies will provide management direction in each landscape unit. Therefore, the company says, green-up will be considered during patch size interpretations but will not impact timber supply on their own.

PIR says the information on visual quality objectives (VQOs) needs to be updated now that landscape unit plans have been approved for all units (except the valley). The company says it is their understanding that the reductions for partial retention and retention VQO constraints are lower in approved landscape unit plans than those presented in the *Analysis Report*.

An individual submission questions how regenerating marginal sawlog/pulplog stands to spruce or pine achieves the objective of landscape unit plans to maintain a diversity of coniferous and deciduous species that represent the natural species composition of each biogeoclimatic subzone.

Unsalvaged Losses

PIR says the spruce bark beetle was not mentioned and the estimated loss due to tomentosus root rot is high, and suggests a combined annual loss for the two may be about 20,550 cubic metres per year.

Socio-Economic Factors

The Village of Telkwa expresses concern about timber being transported out of the region for processing. They say it's crucial that timber harvested locally be processed locally so

communities can reap the employment benefits.

The Town of Smithers expresses support for the Bulkley LRMP and its principles, but are concerned about potential job loss and the effect it could have on local communities.

Other Comments

Several submissions comment on factors or issues other than those specifically covered by Timber Supply Review documents. These comments are summarized in this section.

Timber Supply Review Process

Two submissions say the statement that the AAC determination is an independent, professional judgement is questionable. They say the determination has all the appearances of being purely political, with information being considered only if it supports the current political agenda. These submissions say many non-timber values are not mentioned or considered in the analysis (e.g., living forests as carbon sinks and run-off moderators; berries, mushrooms, and edible and medicinal plants).

Two submissions say the outdoor activities described in the *Information Report* show a bias towards higher cost, wilderness-oriented activities. They say too much focus has been on benefits to a relatively small part of the population and note that most recreational activities are accessible due to logging infrastructure (such as roads) which, they say, contradicts the assertion that industrial activities and recreation are mutually exclusive.

Harvest Levels

The Village of Telkwa and the Town of Smithers express their support for the forecasted AAC. The Town of Smithers also expresses support for diligent planning and activities that maintain or increase harvest levels in the future.

Appendix 1

Submissions received by the Bulkley Forest District

Submissions received on the Data Package

Forest industry

Skeena Cellulose Inc./Repap
Pacific Inland Resources

Government agencies

Ministry of Environment, Lands & Parks (2)

Interest groups

Bulkley Backpackers

General public

One individual submission

Submissions received on the Timber Supply Analysis Report

Forest industry

Pacific Inland Resources

Local government

Village of Telkwa
Town of Smithers

General public

One individual submission